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Perry et al.

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[45] **Apr. 9, 1974**

[54] **COATING MACHINE**

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[73] Assignee: **Prime Manufacturing Company,** Lynn, Mass.

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[52] **U.S. Cl.** **118/324,** 118/DIG. 4

[51] **Int. Cl.** **B05c 5/00**

[58] **Field of Search** ..... 118/324, DIG. 4, 325, 301

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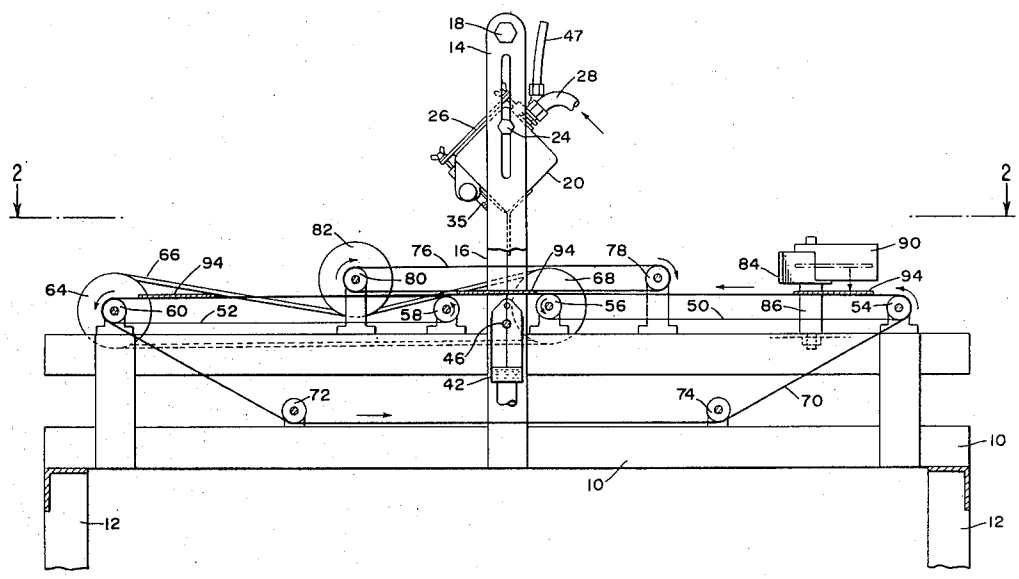
Primary Examiner—John P. McIntosh

Attorney, Agent, or Firm—Kenway, Jenney & Hildreth

[57] **ABSTRACT**

For applying a liquid coating to a selected portion of a flat article such as an insole there is provided a machine including a pair of endless belt conveyors arranged in longitudinal spaced alignment parallel to and in juxtaposition to a third endless belt conveyor; a reservoir disposed above the space between the first pair of conveyor belts and arranged to discharge a vertical liquid curtain of a suitable coating composition down through the space between said pair of conveyors. Above the third conveyor is a fourth conveyor disposed in alignment with the third conveyor and long enough at least to span the space between the first pair of conveyors and so mounted as to cooperate with the third conveyor to grip one end of an article being conveyed jointly by said pair of conveyors and the third conveyor, the result being that the article is held in predetermined position as the liquid curtain deposits liquid on that surface of the article which extends beyond the grip of the third and fourth conveyors.

6 Claims, 6 Drawing Figures



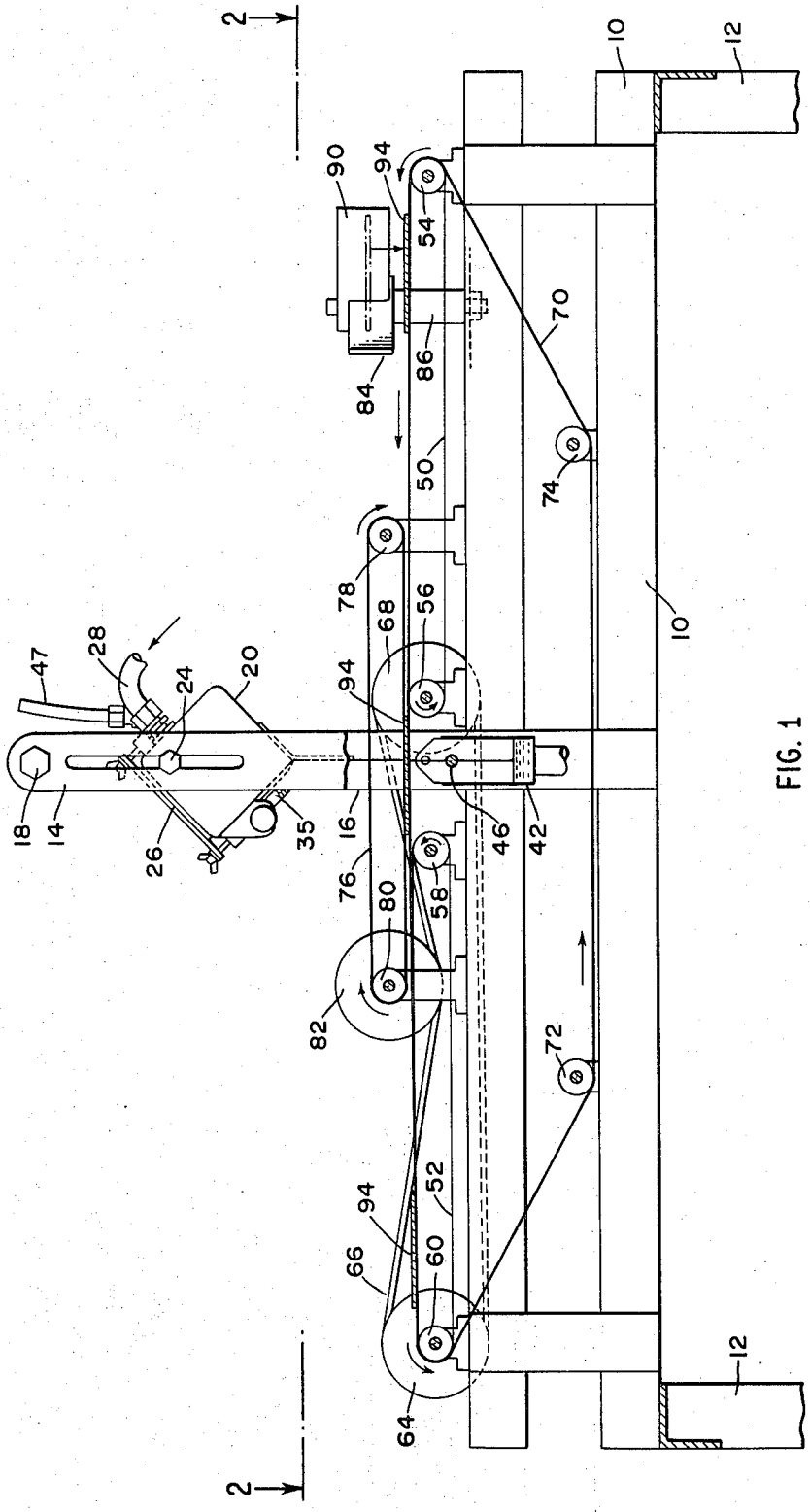

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FIG. 1

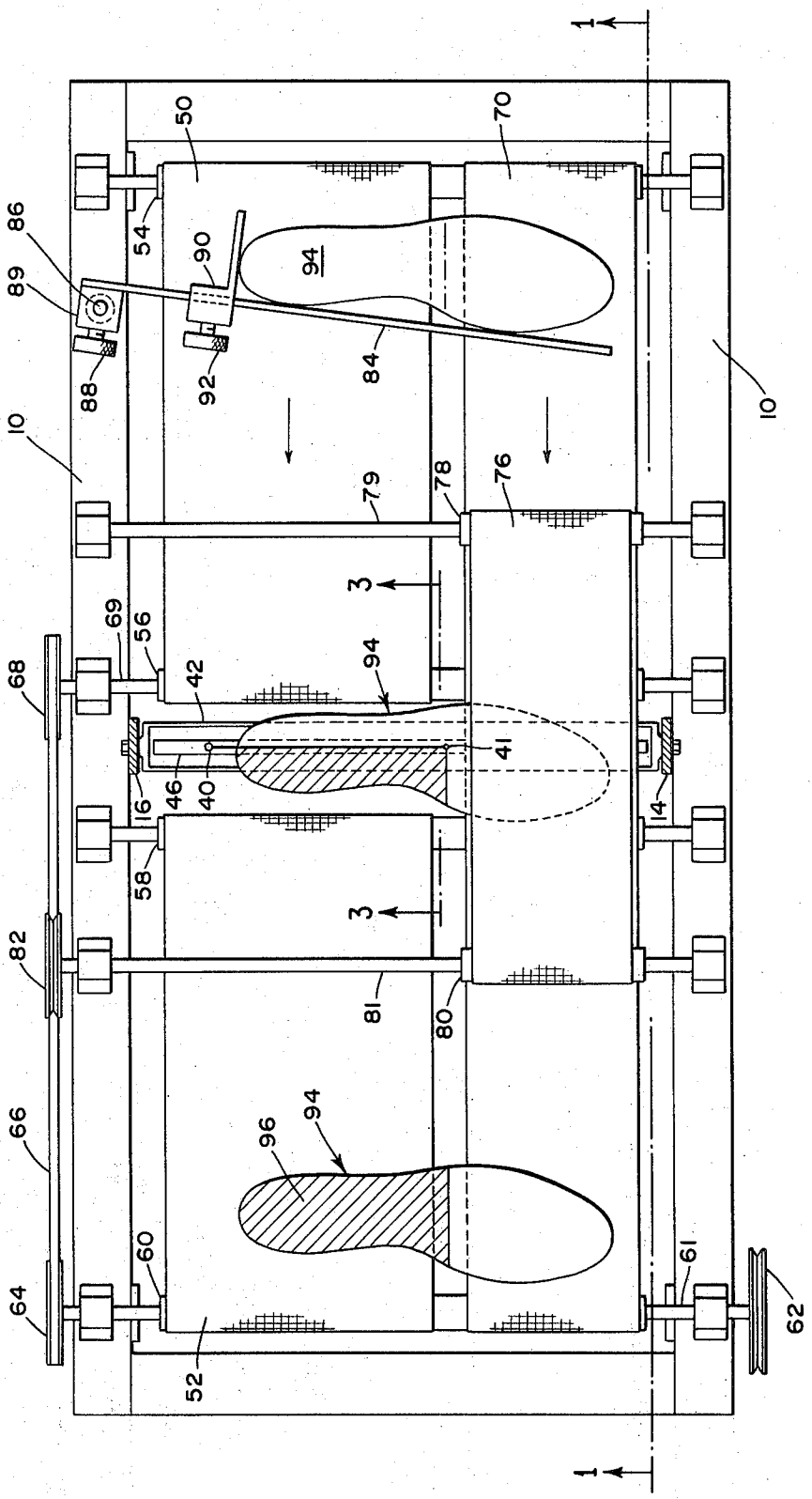

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FIG. 2

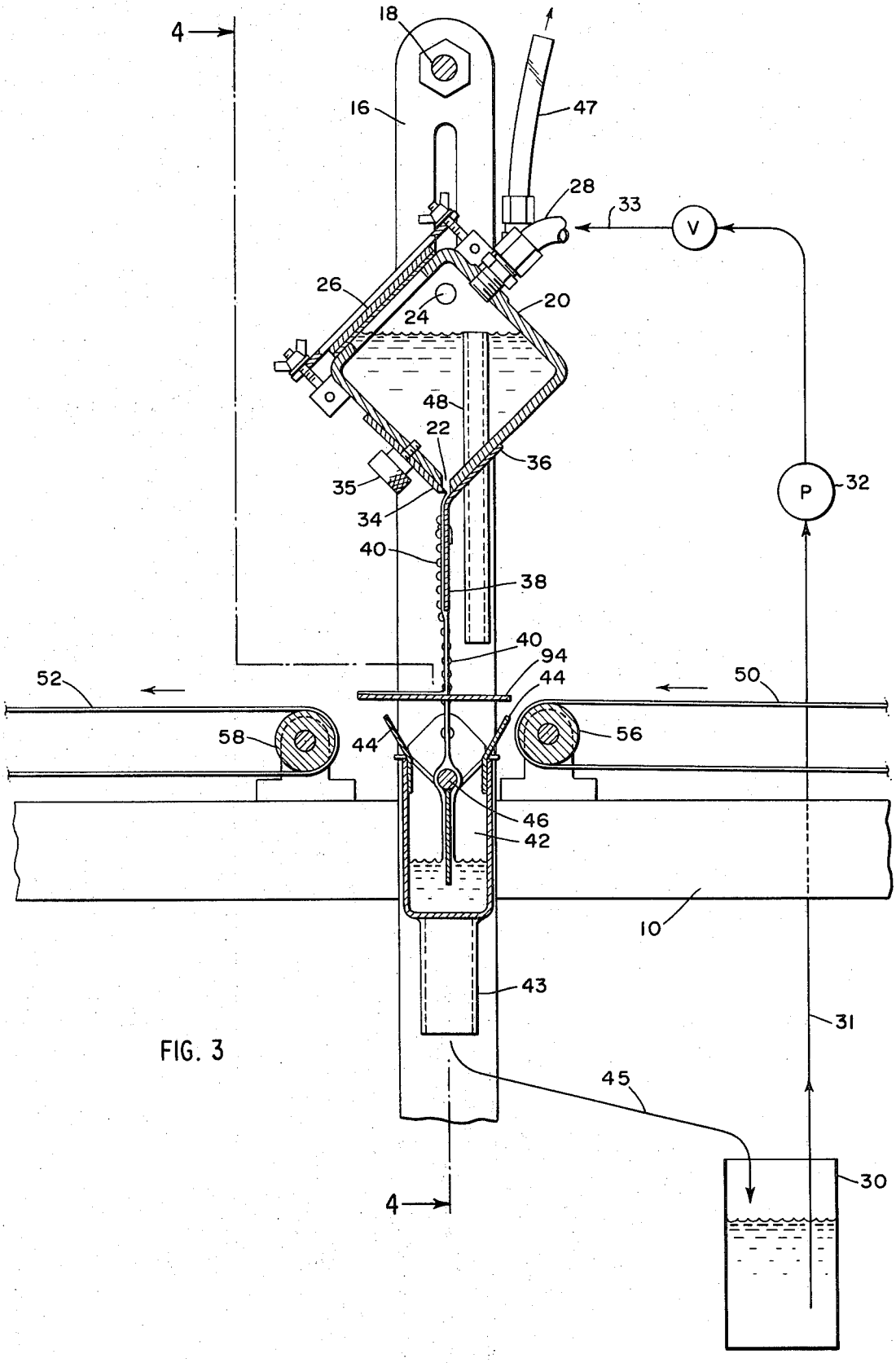

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FIG. 3

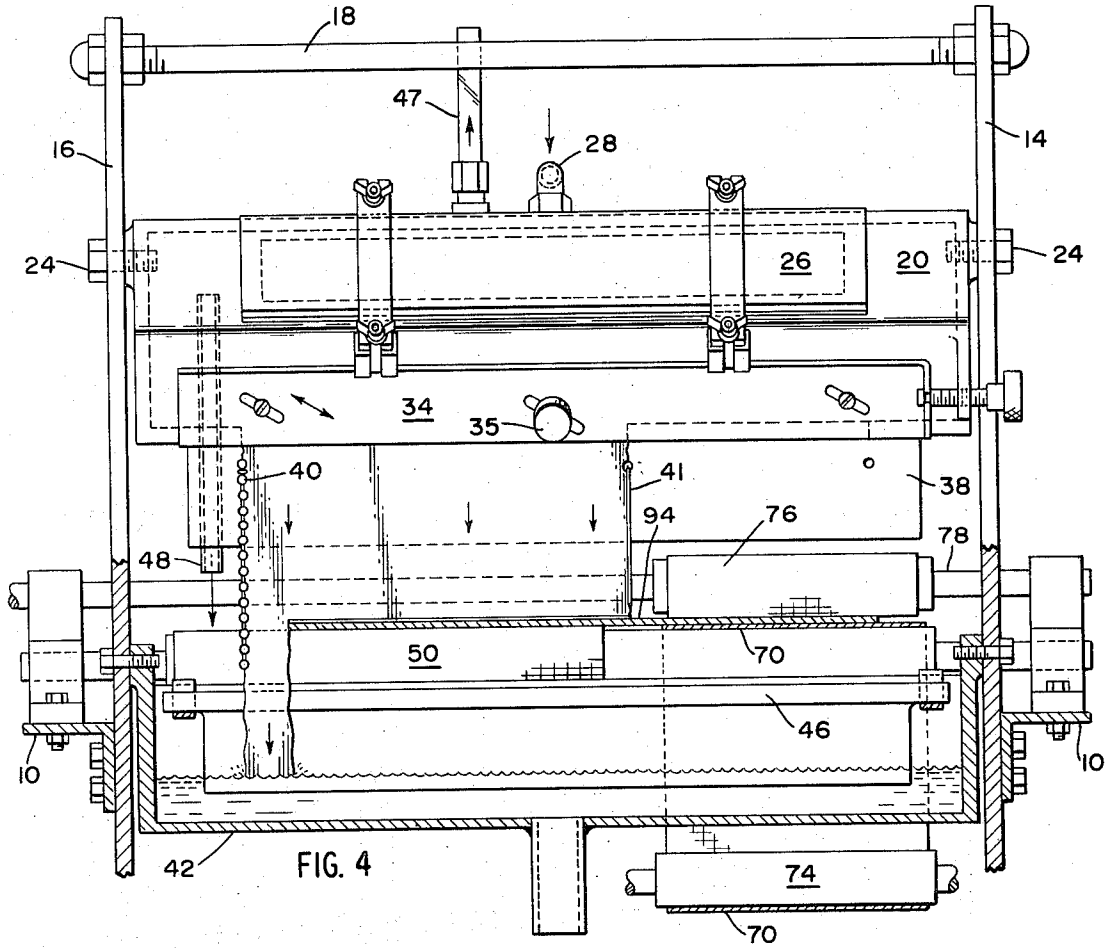
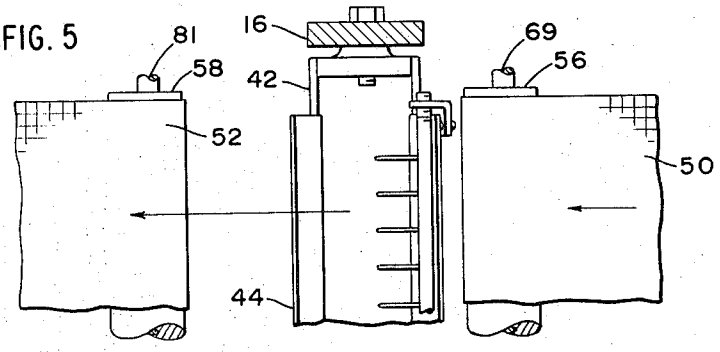


FIG. 4

FIG. 5



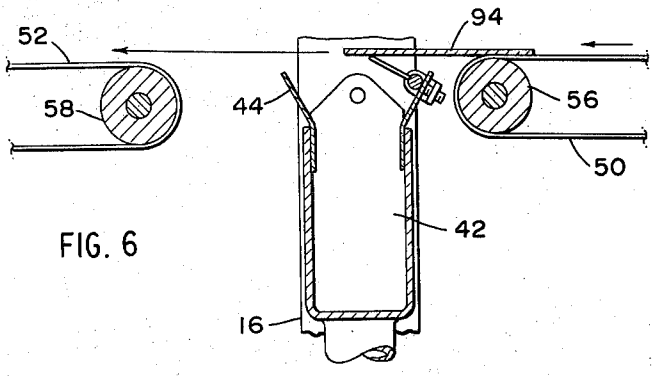


FIG. 6

COATING MACHINE

BACKGROUND OF THE INVENTION

It has been customary in shoemaking to employ a heel pad or sock lining cemented to the upper surface of the insole. In the interests of economy it has been found desirable to eliminate the sock lining and heel pad and secure a satisfactory finished appearance by depositing a pigmented liquid composition on the portion of the insole extending rearwardly from the ball line to the rear end of the insole. While that operation could be accomplished by hand, it is more efficient to accomplish it by conveying the insole through a falling curtain of the liquid composition. Also a more even and level coating is obtained by this means. Machines employing the combination of a conveyor and a reservoir mounted above it have been known, but in prior machines great difficulties have been encountered because the articles being coated tend to shift position, particularly when they encounter the liquid curtain.

The machine of our invention provides means for conveying an insole through a liquid curtain on endless belt conveyors while an auxiliary pair of conveyors supports that portion of the insole which is not to be coated and also grips the insole firmly so that it cannot shift position during the coating process. Variation in the area of the work piece to be coated or of applying the coating at various angles on the work piece is possible by varying the position in which the work piece is gripped by the conveyors.

DESCRIPTION OF A PREFERRED EMBODIMENT

The several features and advantages of our coating machine will be more readily understood and appreciated from the following detailed description of a preferred embodiment thereof selected for purposes of illustration and shown in the accompanying drawings, in which:

FIG. 1 is a view in cross section along the line 1—1 of FIG. 2,

FIG. 2 is a plan view partly in section along the line 2—2 of FIG. 1,

FIG. 3 is a view in cross-section through a portion of the center of the machine showing the means for creating the liquid curtains,

FIG. 4 is a view in cross-section along the line 4—4 of FIG. 3,

FIG. 5 is a plan view of a portion of the machine showing the relationship between the first pair of conveyor belts, and

FIG. 6 is a view in cross-section of the element shown in FIG. 5.

The machine of the preferred embodiment is organized about an elongated rectangular frame 10 mounted on four corner posts 12. At the midpoint of the rectangular frame 10 there is provided a pair of standards 14 and 16, best shown in FIG. 4, and connected at their upper extremities by means of a tie rod 18. Secured to the standards 14 and 16 by means of bolts 24 is a tank or reservoir 20 having a substantially diamond shape cross-section and provided at its lower extremity with a discharge slot 22. The reservoir 20 is provided with a detachable cover panel 26 and is served by a fill pipe 28 by means of which an appropriate amount of a suitable liquid coating composition may be introduced into the reservoir. A tank 30 is disposed at any convenient lower point beneath the frame 10 and is connected by a pipe 31 to a pump 32 discharging through a pipe 33 connected to the fill pipe 28. A control valve is disposed in the line 33. Clamped to one side of the reservoir 20 by means of a bolt 32 is a plate 34 adjacent the discharge slot 22 and having a slot accommodating the bolt 35 and therefore adjustable to control the rate of discharge of liquid from the tank. On the other side of the tank adjacent the discharge slot is fastened a plate 36 having a vertical depending integral apron portion 38 to which is secured a guide chain 40, the arrangement being such that an evenly flowing curtain of liquid leaves the bottom of the apron 38 and falls through a funnel 44 and into a U-shaped trough 42 secured to the standards 14 and 16. A rod 46 spans the length of the trough 42 in position to intercept and stabilize the falling liquid curtain. The trough 42 has at its bottom a discharge pipe 43 connected to the tank 30 by a pipe 45. The reservoir 20 is provided with an overflow pipe 48 arranged to discharge through the funnel 44 into the trough 42, and the tank 20 is also provided with an upwardly extending vent pipe 47.

A pair of longitudinally aligned spaced conveyor belts 50 and 52 are mounted on the frame. The first belt 50 is served by a pair of rollers 54 and 56, while a pair of rollers 58 and 60 serve the belt 52. As shown in FIGS. 2 and 3 the belts 50 and 52 are so arranged that the space between them is occupied by the funnel 44 and the falling curtain of liquid. The roller 60 is mounted on a shaft 61 carrying at one end a pulley 62 adapted to be driven by a suitable motor driven belt (not shown). The other end of the shaft 61 carries a pulley 64 cooperating with a belt 66 to drive a pulley 68 mounted on a shaft 69 on which is mounted the roller 56. The sizes of the rollers and pulleys is such that the belts 50 and 52 are driven in the same direction at the same speed.

A third endless conveyor belt 70 is served by the rollers 54 and 60 and also by a pair of rollers 72 and 74 disposed on the frame 10 beneath the previously described rollers. Since the belt 70 is served by the driven roller 60, it will travel in the same direction and speed as the belts 50 and 52. It will be observed from FIG. 2 that the belt 70 is parallel to the belts 50 and 52 and in close juxtaposition thereto.

Mounted above the belt 70 is a fourth endless conveyor belt 76 carried on rollers 78 and 80 mounted on transverse shafts 79 and 81 journalled in conventional bearing standards. A pulley 82 is secured to one end of the shaft 81 and is served by the belt 66, the arrangement being such that the belt 76 is driven at the same speed as the other belts, and its lower run overlies the belt 70 and rests upon it. The belt 76 is centrally located with respect to the frame 10 and spans the space between the belts 50 and 52.

As shown in FIG. 2 the belts are so driven that an article placed on the belts 50 and 70 will be transported from right to left. At the right-hand end of the machine an arm 84 is pivotally mounted on a post 86 secured to the frame 10 and arranged to be clamped in fixed position by a thumb screw 88 passing through a hub 89 on the end of the arm 84 and into contact with the post 86. A stop member 90 is slidably mounted on the arm 84 and may be clamped in selected position by means of the thumb screw 92.

As shown in FIGS. **1** and **2**, an insole is brought into contact with the arm **84** to adjust its angular position with respect to the belt **50** and **70** and then dropped onto the surfaces of those belts. Preferably the arrangement is such that the rear portion of the insole is disposed on the belt **50** and its forepart on the belt **70.** As the insole progresses to the left its forepart passes between the belt **70** and **76** and is gripped between them so that its angular position is fixed. In this condition the sole is passed through the liquid curtain descending from the tank **20** and thereby receives a coating **96** of the liquid composition. The excess liquid falls through the funnel **44** into the trough **42** and thence into the sump **30** to be returned by the pump **32** to the tank **20.**

It will be obvious to those skilled in the art that our invention is not limited to the particular details of the machine shown in the drawings, although that machine is the best mode known to us for practicing our invention. The scope of the invention is defined by the appended claims.

We claim:

1. A machine for applying liquid to a selected portion of a flat article, which comprises a pair of longitudinally aligned spaced endless belt conveyors, means disposed above said conveyors for directing a thin curtain of liquid downwardly through the space between said conveyors, a third endless belt conveyor mounted in closely spaced parallel relation to said pair of conveyors and extending substantially the combined lengths of said pair of conveyors, and a fourth endless belt conveyor disposed above and parallel to said third conveyor, the belts of said third and fourth conveyors being disposed to grip an article between them.

2. The machine defined in claim **1** wherein means is provided for driving all of the conveyor belts at the same speed.

3. A machine for applying liquid to a selected portion of a flat article, which comprises a pair of longitudinally aligned spaced endless belt conveyors, means disposed above said conveyors for directing a thin curtain of liquid downwardly through the space between said conveyors, a third endless belt conveyor mounted in closely spaced parallel relation to said pair of conveyors and extending substantially the combined lengths of said pair of conveyors, and a fourth endless belt conveyor disposed above and parallel to said third conveyor, the belts of said third and fourth conveyors being disposed to grip an article between them, said fourth conveyor being substantially shorter than the third conveyor and disposed to overlie the third conveyor opposite the space between said pair of conveyors.

4. A machine for applying liquid to a selected portion of a flat article, which comprises a pair of longitudinally aligned spaced endless belt conveyors, means disposed above said conveyors for directing a thin curtain of liquid downwardly through the space between said conveyors, a third endless belt conveyor mounted in closely spaced parallel relation to said pair of conveyors and extending substantially the combined lengths of said pair of conveyors, a fourth endless belt conveyor disposed above and parallel to said third conveyor, the belts of said third and fourth conveyors being disposed to grip an article between them, and means for driving all of said conveyors at the same speed.

5. The machine defined in claim **4** wherein the fourth conveyor belt spans the space between said pair of endless belt conveyors.

6. A machine for applying liquid to the surface of the rear portion of an insole, comprising a pair of longitudinally aligned spaced conveyor belts, means for directing a curtain of liquid downwardly through the space between said belts, a third conveyor belt parallel to said pair of belts and in juxtaposition thereto, said third belt being substantially as long as the combined lengths of said pair of belts, and a fourth conveyor belt disposed above and in contact with said third belt, whereby an insole may be so disposed that its rear portion is carried on said pair of belts and its forepart portion carried on said third belt, the third and fourth belts cooperating to grip the forepart portion of the insole to hold it in fixed angular position.

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